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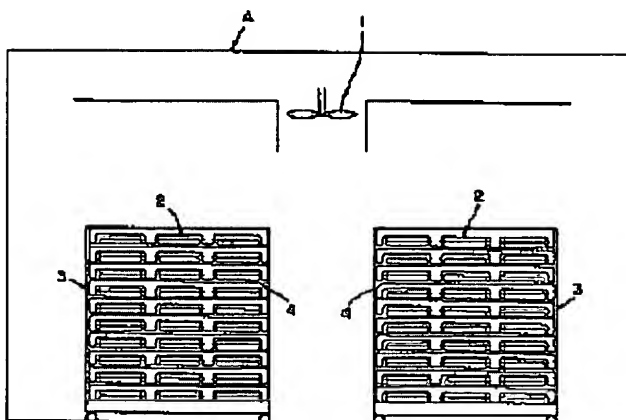
## THAWING OF FOOD

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## Abstract of JP11098974

**PROBLEM TO BE SOLVED:** To provide a method for thawing foods capable of thawing many kinds of foods having the same quality to that at the preparation or a better quality than that in a large number simultaneously.

**SOLUTION:** This method for thawing foods is provided by thawing with heating a food 2 in a state of almost hermetically packed with securing a space surrounding the food after freezing, over at least a part of the thawing time with a warm wind at approximately  $\geq 40$  deg.C (e.g.; 40-80 deg.C, preferably 40-60 deg.C) to elevate the temperature, and then reducing the temperature of the warm wind rapidly so as to maintain the temperature at the surface of the food not exceeding 25 deg.C (preferably at 18 deg.C). By the combination of the surrounding space provided to the food and the specific thawing conditions, it becomes possible to thaw plural kinds of foods such as a raw fish, a cooked rice, a cooked daily dish, etc., having the same quality to that at the preparation or better quality than that in a same thawing chamber in a large amount at the same time.



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(54) 【発明の名称】 食品の解凍方法

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(57) 【特許請求の範囲】

【請求項 1】食品の解凍方法であって、冷凍後にその周囲に空間を確保して略密封包装した食品を解凍するに際して、食品の表面温度が 2.5℃を超えない状態で温風加熱した後、食品の中心温度が氷結品の融解温度を通過する段階で約 4.0℃以上の温度で加熱して温度上昇させ、その後食品の表面が 2.5℃を超えない温度を維持するように温風の温度を急激に下げて解凍することを特徴とする、食品の解凍方法。

【請求項 2】冷凍後の食品を、1.4～2.5℃の低温風で加熱した後、約 4.0～6.0℃の高温風で加熱して温度を上昇させる、請求項 1 記載の解凍方法。

【請求項 3】空間の容積が食品の容積の 5%以上である、請求項 1 または 2 記載の解凍方法。

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～3のいずれか 1 項記載の解凍方法。

【請求項 5】大量数または多品種の食品の解凍に用いる、請求項 1～4 のいずれか 1 記載の解凍方法。

【請求項 6】食品が米飯、その他 1 種以上の食品、およびその両者を組合わせた米飯食品から選択された食品である、請求項 1～5 のいずれか 1 記載の解凍方法。

【発明の詳細な説明】

【0001】 【発明の背景】

【発明の属する技術分野】本発明は、冷凍後に解凍しても調整時の品質がほとんど変化しない、食品の解凍方法に関するものである。

【0002】

【従来の技術】食品を凍結して長期保存をおこない、利用する際に解凍して摂取するという技術は古くから行わ

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存して解凍した食品を保存前の食品と比較すると、品質が劣化していることは否めない事実であった。そのため、その劣化を防止することを目的として様々な技術が提案されてきた。これらの技術のほとんどは特表平9-500542号に見られるような食品を凍結させる工程における工夫に関するものであったが、それだけでは十分に満足できる品質劣化防止効果が得られていなかった。

#### 【0003】〔発明の概要〕

【発明が解決しようとする課題】本発明は、食品を、冷凍後に、調製時のままの品質であるいはそれ以上の品質で提供し、しかも、特に本来解凍条件の異なる種々の食品を同一条件で大量数処理することができる解凍方法を提供することを目的とするものである。

#### 【0004】

【課題を解決するための手段】本発明者らは、上記問題を鑑み鋭意検討した結果、対象となる食品を、冷凍後にその周囲に適当な空気層を確保して略密封包装した状態で、全解凍時間の少なくとも一部において約40℃以上の温風雰囲気下で加熱して温度上昇させ、その後食品の表面が25℃を超えないように温風の温度を急激に下げて解凍することにより、上記問題が解決できることを見出し、本発明を完成させるに至った。すなわち、本発明は、食品の解凍方法であって、食品を、冷凍後にその周囲に空間を確保して略密封包装した状態で、解凍時間の少なくとも一部にわたり約40℃以上の温風で加熱して温度上昇させ、その後食品の表面が25℃を超えない温度を維持するように温風の温度を急激に下げて解凍することを特徴とする食品の解凍方法である。本発明における各条件の好ましい態様は、空間の容積に関しては食品の容積の5%以上であり、包装に関してはビロー包装であり、また解凍条件に関しては、約40℃以上の温度における解凍を、食品の中心温度が氷結晶の融解温度を通過する段階で行うことである。本発明の一つの好ましい態様は、解凍時間の少なくとも一部にわたり約40℃以上の温風で加熱する工程において、冷凍後の食品を、14～25℃の低温風で加熱した後に約40～60℃の高温風で加熱することである。

【0005】〔発明の具体的説明〕本発明による食品の解凍方法は、食品を、冷凍後にその周囲に空間を確保して略密封包装した状態で、解凍時間の少なくとも一部にわたり約40℃以上の温風で加熱して温度上昇させ、その後食品の表面が25℃を超えない温度を維持するように温風の温度を急激に下げて解凍することを特徴とするものであることは前記したところであり、特に食品周囲に空間を確保した略密封に近い包装と均一温度を維持するための温風および食品表面の一定温度以下（25℃以下）の維持を組み合わせたことにより、食品を、調製時のままの品質であるいはそれ以上の品質で提供し、しか

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ず処理する目的にも適した解凍方法を提供することを可能としたものである。

【0006】本発明の対象となる食品は、米飯、その他の1種以上の食品、米飯とその他の1種以上の食品を組み合わせた米飯食品であり、本発明においてはこれらの食品種をそれぞれ単独でまたは複数種組合せて解凍処理することができる。その他の食品の好適な具体例としては、焼き魚、卵焼き、フライ、てんぷらなどの惣菜類が上げられる。米飯食品の好ましい例としては、上記のような惣菜類の1種以上と米飯を組み合わせた幕の内弁当や、さば、あじ、かになどの魚介類を酢飯の上に載せて加圧成形した押し寿司などを代表例としてあげることができる。しかし、特に限定されず、巻寿司や具入りおにぎりをはじめとして、米飯とその他1種以上の食品を組み合わせたものであれば広く適用が可能であることはいうまでもない。

【0007】本発明において、まず上記のような食品を凍結工程に供する。この場合、米飯、その他の1種以上の食品、および米飯食品をそれぞれ単独で、または2種以上組合せて同時に同一凍結工程に供することができる。食品の冷凍条件は、食品が凍結する条件であれば特に限定されず、通常の冷凍庫による凍結、液化炭酸ガスの吹き付けあるいはエアブラスト式多元（通常は2元）冷凍式圧縮機フリーザー（-45～-75℃）などによる凍結が可能である。凍結工程において食品は無包装であっても食品用の薄い透明フィルムでラップしておいても構わないが、無包装の場合は液化炭酸ガスによる方法が適しており、また密着ラップ包装されている場合はエアブラスト式フリーザーでも可能である。凍結は、通常食品の中心温度が-15～-30℃の範囲、好ましくは-20℃以下になるまで続ける。なお、液化炭酸ガスの吹き付けによる凍結工程は、小規模の場合には通常の液化炭酸ガス吹き付け装置を用いればよく、大規模レベルでは、トンネル式液化炭酸ガス吹き付け装置などを用いて行うことができる。

【0008】上記のような所定の凍結温度条件まで達した後、通常食品を保存工程に移し、次の解凍工程に供するまで必要な期間保存する。保存は-25℃以下、好ましくは-25～-35℃の範囲で行なう。この保存工程においては、上記所定の温度範囲を上回ると、解凍後の品質が低下するので好ましくない。なお、この保存工程は通常食品用冷凍庫を用いて行うことができる。

【0009】本発明において、凍結した食品は保存工程前または次の凍結工程前に、好ましくは保存工程前に包装工程に付す。凍結食品の包装は、食品外面との間に空間、通常食品容積の5%以上の周囲空間、好ましくは5%～20%、より好ましくは30%～100%の周囲空間を確保して略密封包装する。包装により食品の周囲に設けるこの閉鎖空間は、次の解凍工程において食品が

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あり、通常は周囲環境で包装して空気層を含むものであるが、 $N_2$ ガス中など他の周囲環境で包装してその気体層を含むものであってもよい。

【0010】包装材料は、通常密封包装に用いられる包装材料などを用いることができ、例としてポリプロピレン、ポリエチレン等のプラスチックフィルムや紙とプラスチックのラミネート紙等があげられるが、特に延伸ポリプロピレン製フィルムが好ましい。包装材料のシールは、各材料の性質に合わせて熱融着、高周波接着、粘着剤による接着等の通常の方法を用いて行うことができ、

包装材料によっては特にシールを行わずに折り曲げ、捻じり等により封をおこなってもよい。食品周囲に閉鎖空間を設けた略密封包装の具体例としては、必要な空間を確保することが可能であれば、袋状包装（例えばビロー包装、3方シール包装、4方シール包装、製袋済の袋を使用する包装）や箱状包装、トレーと蓋の組合せによる包装、（食品が適当な強度および包装材料と同程度の断熱性を有する容器に入れてある場合には）ラップ包装、シュリンク包装などが使用可能である。その中でも主として操作性、密封性等の点からビロー包装が好ましい。具体的には、食品を1個または複数個包装材料にセットし、食品周囲に適当な上記空間が確保されるようにして通常の周囲環境または $N_2$ ガス環境下で略密封包装する。必要があれば、包装内の食品はプラスチック（発泡スチロールなど）製の開放容器等に入った状態のものでよい。本発明において、略密封包装とは、次の解凍工程での温風加熱処理により本発明の効果（食品への温和な熱伝導）を発揮できるような程度の密封性を有する包装を意味し、具体的には例えば、次の解凍工程での温風雰囲気下において上記所定の周囲空間を保持しながら外気環境との流通が実質的にない状態（流通率50容量%以下）の包装を意味し、この条件を満たすものであれば包装材料の種類は問わず、またそのシール性も完全であることが望ましいが不完全であっても構わない。

【0011】上記のように包装した食品は、本発明において最大の特徴を有する最後の解凍工程に移される。解凍工程は、全解凍時間の少なくとも一部の時間にわたり、約40℃以上、例えば約40℃～80℃、好ましくは約40℃～60℃（具体的には38℃～62℃）の温風雰囲気下で加熱処理を行う操作、およびその後食品の表面が25℃を超えない温度を維持するように温風の温度を急激に下げる操作による解凍処理を含む。すなわち、解凍工程においてこれらの特定の温度範囲条件下および温風雰囲気下での解凍は必須であり、必要に応じて他の解凍温度条件を組合わせて用いてもよい。具体的には、解凍の全工程を上記の特定温度範囲で行なう必要はなく、特定の段階では、好ましくは最も温まり難い食品の中心温度が氷結晶の融解温度（一般に-5℃前後）を通過する際には、約40℃以上、通常は約40℃～80

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氷結晶の融解時間の範囲内で解凍を行う（急速解凍処理）ことは必須であるが、その他の時点においては、必要に応じて下限の約40℃（具体的には38℃）より低い温度で穏やかに解凍を行ってもよいということである。

【0012】本発明の好ましい態様においては、氷結晶の融解温度（-5℃近辺）では、状態変化があるだけで品温の変化はほとんど見られないことから、解凍工程の初期においては14～25℃、より好ましくは20℃程度（具体的には18～22℃）で緩慢に解凍し、中心温度が-5℃近辺では約40℃（具体的には38～42℃）以上で急速解凍することが望ましい。このような本発明の方法により、生魚類等を用いた鮮度を要する米飯食品（たとえば押し寿司など）も他の種々の食品と同じ解凍条件で同時に解凍処理が可能となる。急速解凍の後の、食品表面温度を25℃（好ましくは18℃）以下に維持するための温風温度の急激な低減操作は、実際には通常15～20℃程度、好ましくは約18℃の低温風に切り換えて行う。解凍工程は、上記のように全解凍時間の少なくとも一部にわたり約40℃以上の温風で行い、その後食品の表面が25℃を超えないように、好ましくは18℃以下となるように、温度を上昇させた後に急激に温風の温度を下げて表面温度を調節することが基本である。

【0013】本発明において、上記のような温風雰囲気下での解凍処理を実施するために、合目的な任意の恒温装置、すなわち一定の温度に設定可能かつ装置内の場所による温度むらをなくす（均一温度を保つ）ための温風機を備えた恒温装置を用いることができる。また本発明においては、多数量の食品を同時に解凍処理することに適しているので、恒温装置は大量の食品を設置しかつ装置内全体に均一に温風を送ることができる構造であることが望ましい。

【0014】上述のような機能を有する恒温装置としては、具体的には例えば図3に示すような大数処理用の解凍庫（A）を用いることができる。この解凍庫（A）は、一定の温度に調節可能かつ庫内に均一に温風を送ることができるファン（1）を備え、内部に大量数の冷凍された食品（2）を配置できる多段状の移動棚（3）が複数出し入れできるようになっている。ファン（1）により温風が棚（3）の各段のトレー（4）上の各食品列相互の空間を通して庫内を循環し、庫内の食品（2）全体により均一な温風が送られるようになっている。冷凍された食品（2）は、図1に示すように包装材料（5）により、空気層からなる一定の周囲空間（6）を確保した状態で密封シールされており、複数の移動棚（3）の各段のトレー（4）上に配列されている（図2）。トレーは温風が伝わりやすい構造になっていることが好ましく、例えばプラスチック製の網状のトレーが好適例とし

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の移動部(3)を、図3に示すように解凍庫(A)内に移動、配置し、解凍庫を閉扉した後に庫内全域にファン(1)によって均一な温風を連続的に送ること、上記周囲空間を介して温和な熱伝導により(底部は包装材料およびトレイ部を介した温和な熱伝導により)、食品の表面温度と芯温度の差が少なく、食品からのドリップの少ない解凍を行うことができる。

【0015】上述したような本発明の解凍方法によれば、後記実施例に示されるように、種々の食品を調製時のままの品質で、同時に大量に解凍することができることが分った。

【0016】

【実施例】以下は、実施例により本発明をさらに詳しく説明するものである。

【実施例1】弁当の内箱として使用されるプラスチック製の容器(縦17cm×横25cm×厚さ3.5cm)に米飯、惣菜類を盛り付けて上蓋をしない状態で凍結(液化炭酸ガス併用圧縮式冷凍機で-50℃)したものを、透明プラスチックフィルム(ポリプロピレン製、40μm厚)でピロー包装した。この際、図1の通りピロー包装の内部で弁当の内箱とフィルムの間に距離があくような含気状態(含気量=食品全容量の約100%)で熱融着により密封した。ピロー包装後、-25℃以下で保管したものを図2に示す通り1段6個程度をプラスチック製の網状トレイ上に配列し、10~12段の右直に重ねて、図3の構造の温風式解凍庫に入れた。解凍開始後、2時間程は約20℃の温風を循環させて弁当の中心温度が約-5℃になるまで加熱した後、庫内温度45℃で40分間加熱した。その後、弁当の温度が18℃以上にならないように20分で庫内温度を18℃に下げて解凍した。

【0017】【評価例1】実施例1および凍結していない幕の内弁当について、9名のパネラーにより食味の評価をおこなった。その結果、実施例1のものは、凍結解凍していないものと比較して、9名が差異が無いと回答した。むしろ凍結解凍していない幕の内弁当で、製造後数時間経過しているものより、解凍終了直後の実施例1の幕の内弁当は、食味が良好であるとの評価であった。

【0018】【比較例1】冷凍した幕の内弁当をピロー包装を行わないで実施例1と同様に解凍を行った。この場合、米飯、惣菜ともに表面が乾燥して食味、食感ともに本来の品質が損なわれていた。また、食品の表面温度が常温保存の適温を超えて30℃程度になっていたため細菌の繁殖による品質の劣化が心配された。

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【0019】【比較例2】冷凍した幕の内弁当をピロー包装の内部を脱気状態にして包装し、実施例1と同様に解凍を行った。温風の吹き出し口に近い部分が他の部分より解凍が早く進んでしまって、他の部分との解凍むらを生じてしまった。

【0020】

【発明の効果】上述してきたように、本発明方法によれば、食品に設けた閉鎖空間と特定条件の解凍工程の組み合わせにより、生魚類、米飯、調理済惣菜など複数種の食品を、調製時のままの品質であるいはそれ以上の品質で、同一解凍庫内で一度に大量に解凍することが可能となる。さらに、本発明によれば、具体的には下記のような効果がある。一連の凍結・解凍システムにおいて、包装材料と食品の周囲に閉鎖空間を設けることによって品質の劣化を大幅に改善することができる。この空間により、温風熱が温和に伝わるため、外界環境の温度上昇、下降による乾燥、結露の影響が少なく、従って、食品の表面温度と芯温度差が少なく、ドリップの防止が可能である。弁当等の従来は製品として取扱われていた食品を、冷凍材料と同様に扱うことができるため、出荷量の多い場合にも大量に作り置きしても、細菌の繁殖のような危険のない安全な食品を提供することができる。この場合、食品を製造後即時(連続凍結が望ましい)に凍結することにより、一層その効果が高まる。略密封の包装状態で保存されるため、保存中の汚染を防止できる。包装時に、開梱時の温度(通常室温)における飽和湿度に近い雰囲気状態で包装することにより、食品の乾燥防止の効果が高まる。

【図面の簡単な説明】

【図1】実施例1における食品のピロー包装の状態を示す斜視図。

【図2】実施例1における幕の内弁当(ピロー包装)の棚上での配列状態を示す斜視図。

【図3】実施例1における解凍庫内での幕の内弁当(棚上に配列)の配置状態を示す正面図。

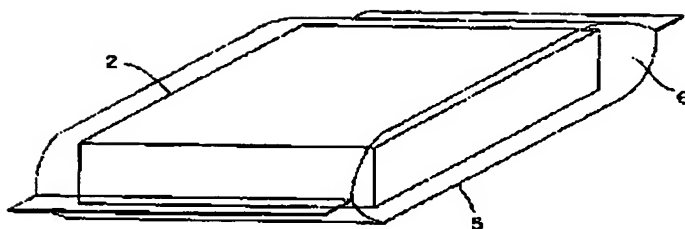
【符号の説明】

- A 解凍庫
- 1 ファン
- 2 食品
- 3 棚
- 4 トレイ
- 5 包装材料
- 6 食品周囲の空間

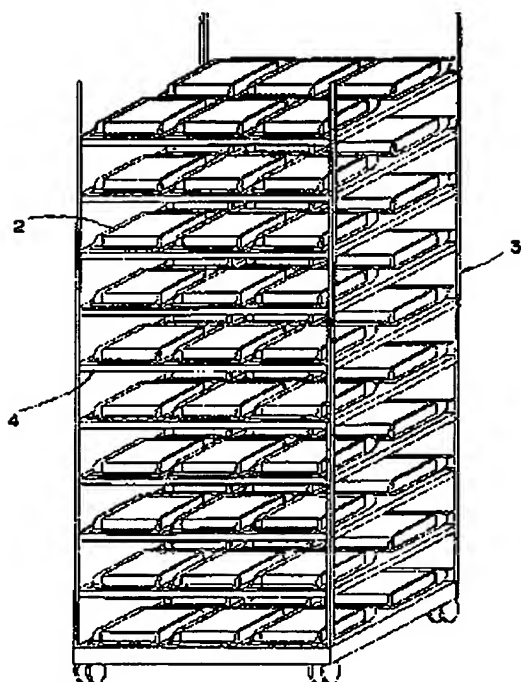
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特許3180064

【図1】



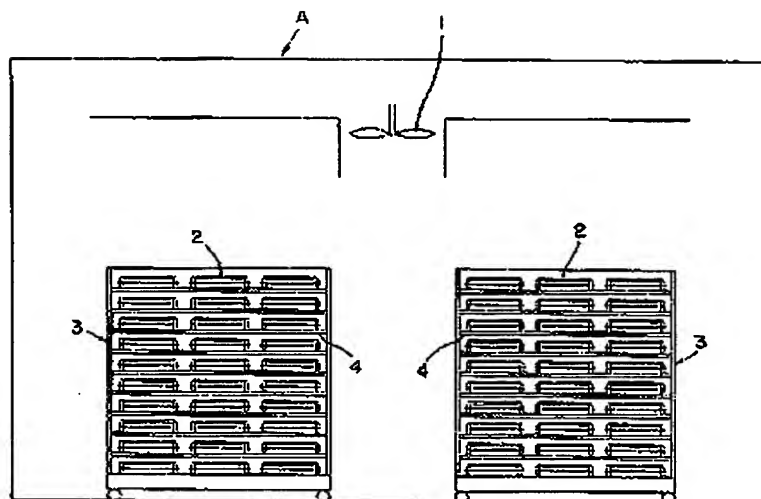
【図2】



(5)

特許3180064

【図3】



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特公 昭59-33342 (J P, B2)

(58)調査した分野(Int.Cl.<sup>7</sup>, D B名)

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B65D 81/18 - 81/30  
B65D 81/38

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3. In the drawings, any words are not translated.

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**CLAIMS**

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(57) [Claim(s)]

[Claim 1] Are the defrosting approach of food and it faces thawing the food which secured space in the perimeter and carried out the abbreviation seal package after refrigeration. After carrying out warm air heating in the condition that the skin temperature of food does not exceed 25 degrees C, a temperature rise is heated and carried out at the temperature of about 40 degrees C or more in the phase where the main temperature of food passes the melting out temperature of an ice crystal. The defrosting approach of food characterized by lowering the temperature of warm air rapidly and thawing it so that the temperature to which the front face of the maturing feeding article does not exceed 25 degrees C may be maintained.

[Claim 2] About the food after refrigeration, after [ 14-25 degrees C ] being the style of low temperature and heating, it is the about 40-60-degree C defrosting approach according to claim 1 of being the style of an elevated temperature, heating and raising temperature.

[Claim 3] The defrosting approach according to claim 1 or 2 that the volume of space is 5% or more of volume of food.

[Claim 4] The defrosting approach of claim 1-3 given in any 1 term that a package of food is a pyro package.

[Claim 5] The defrosting approach of any 1 publication of claims 1-4 used for defrosting of the food of an extensive number or many forms.

[Claim 6] The defrosting approach of any 1 publication of claims 1-5 that food is rice, one or more sorts of other food, and the food chosen from the rice food with which the both were combined.

**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001] [Background of the Invention]

[Field of the Invention] Even if it thaws this invention after refrigeration, the quality at the time of adjustment is related with the defrosting approach of food of hardly changing.

[0002]

[Description of the Prior Art] Food is frozen, a mothball is performed, and in case it uses, the technique of thawing and taking in is performed for many years. However, when a Prior art was used, that quality has deteriorated as compared with the food before saving the thawed food which carried out cryopreservation was the fact which cannot be denied. Therefore, various techniques have been proposed for the purpose of preventing the degradation. Although most of these techniques were related with the device in the process which freezes food which is looked



at by \*\*\*\*\* No. 500542 [ nine to ], the quality degradation prevention effectiveness it can fully be satisfied only with it of the effectiveness was not acquired.

[0003] [Summary of the Invention]

[Problem(s) to be Solved by the Invention] this invention is the quality still in the state at the time of preparation after refrigeration about food -- it is -- it aims at providing in the quality beyond it and offering the defrosting approach that the various food with which defrosting conditions differ especially originally can moreover be extensive-number-processed on the same conditions.

[0004]

[Means for Solving the Problem] this invention persons are in the condition which secured the suitable air space for the perimeter, and carried out the abbreviation seal package of the target food after refrigeration, as a result of inquiring wholeheartedly in view of the above-mentioned trouble. It came to complete a header and this invention for the above-mentioned problem being solvable by heating and carrying out a temperature rise in a part of all defrosting time amount [ at least ] under warm air ambient atmosphere about 40 degrees C or more, lowering the temperature of warm air rapidly and thawing it so that the front face of the maturing feeding article may not exceed 25 degrees C. That is, this invention is the defrosting approach of the food which is the defrosting approach of food, and is in the condition which secured space in the perimeter and carried out the abbreviation seal package after refrigeration, heats food by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ], make carry out a temperature rise, and is characterized by to lower the temperature of warm air rapidly and to thaw it so that the temperature to which the front face of the maturing-feeding article does not exceed 25 degrees C may maintain. The desirable mode of the monograph affair in this invention is being 5% or more of the volume of food, and being a pyro package about a package, and performing the defrosting in the temperature of about 40 degrees C or more about defrosting conditions about the volume of space, in the phase the main temperature of food passing the melting out temperature of an ice crystal. In the process heated by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ], about the food after refrigeration, it is the style of low temperature, and it is the style of an elevated temperature and one desirable mode of this invention is an about 40-60-degree C thing to heat, after [ 14-25 degrees C ] heating.

[0005] [Concrete explanation of invention] the defrosting approach of the food by this invention Where it secured space in the perimeter and an abbreviation seal package is carried out after refrigeration, food A temperature rise is heated and carried out by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ]. It just described above that it was what is characterized by lowering the temperature of warm air rapidly and thawing it so that the temperature to which the front face of the maturing feeding article does not exceed 25 degrees C may be maintained. By combining the maintenance below the warm air for maintaining the package near the abbreviation seal which secured space especially in the perimeter of food, and homogeneity temperature, and the constant temperature on the front face of food (25 degrees C or less) about food, it is the quality still in the state at the time of preparation -- it is -- it makes it possible to provide in the quality beyond it and to offer the defrosting approach also suitable for the purpose which carries out extensive processing of the various food with which defrosting conditions moreover differ originally on the same defrosting conditions.

[0006] The food set as the object of this invention is the rice food which combined rice, one or more sorts of other food, and rice and one or more sorts of other food, in this invention, it can be independent respectively, or can combine these food kinds of two or more sorts, and can carry

out defrosting processing. As a suitable example of other food, daily dishes, such as roast fish, an omelet, a fry, and tempura, are raised. The pressed sushi which carried the fish and shellfishes of the box lunch which combined one or more sorts and rice of the above daily dishes, mackerel, \*\*\*\*, \*\*, etc., etc. on vinegared rice, and carried out pressing as a desirable example of rice food can be raised as an example of representation. however, it limits especially -- not having -- volume sushi and an ingredient -- if one or more sorts of food is combined with rice including an entering rice ball in addition to this, it cannot be overemphasized that it can apply widely.

[0007] In this invention, a freezing process is first presented with the above food. In this case, it is independent, respectively, or rice, one or more sorts of other food, and two or more sorts of rice food can be combined, and the same freezing process can be presented with them at coincidence. Especially if the frozen conditions of food are conditions which food freezes, they will not be limited, but freezing in freezing by the usual freezer, blasting of a liquefied carbon dioxide, or an air-blast type plural (usually 2 yuan) refrigerant type compressor freezer (-45--75 degree C) is possible for them. Even if food is unpacked in a freezing process, it does not matter even if it carries out the lap by the thin bright film of a food grade, but when the approach by the liquefied carbon dioxide is suitable when unpacked, and the adhesion lap package is carried out, it is possible also in an air-blast type freezer. the range whose main temperature of food of freezing is usually -15--30 degree C -- it continues until it becomes -20 degrees C or less preferably. In addition, the freezing process by blasting of a liquefied carbon dioxide can be performed on large-scale level using tunnel type liquefied carbon dioxide blasting equipment etc. that what is necessary is just to use usual liquefied carbon dioxide blasting equipment, when small-scale.

[0008] required after reaching to the above predetermined freezing temperature conditions until it usually moves food to a preservation process and presents the following defrosting process -- period preservation is carried out. -25 degrees C or less of preservation are preferably performed in -25--35 degree C. In this preservation process, if it exceeds the above-mentioned predetermined temperature requirement, since the quality after defrosting will deteriorate, it is not desirable. In addition, this preservation process can be performed using the usual food-grade freezer.

[0009] In this invention, the frozen food is preferably given to a packaging process in front of a preservation process in front of a preservation process or the following freezing process. a package of freezing food -- between food external surface -- space -- usually -- 5% or more of perimeter space of the food volume -- 30% - 100% of perimeter space is secured more preferably 5% to 200%, and an abbreviation seal package is carried out. Although this closing space established in the perimeter of food by package is for preventing that food touches this defrosting environment directly in the following defrosting process, is usually packed in a perimeter environment and contains an air space, it may be packed in other perimeter environments, such as inside of N2 gas, and may contain that gas layer.

[0010] Although the wrapping usually used for a seal package can be used for wrapping and plastic film, such as polypropylene and polyethylene, paper, the laminated paper of plastics, etc. are raised as an example, the film made from extension polypropylene is especially desirable. The seal of wrapping can be performed using the usual approaches, such as heat welding, RF adhesion, and adhesion by the binder, according to the property of each ingredient. It may bend without performing a seal especially depending on wrapping, and torsion etc. may perform \*\*. As an example of an abbreviation seal package in which closing space was established in the perimeter of food If it is possible to secure required space, it is a saccate package (for example, a

pyro package). The method seal package of three, the method seal package of four, the package which uses a bag [ finishing / bag manufacture ] and a box-like package, the package by the combination of a tray and a lid, a lap (when having put food into container which has adiathermic [ comparable as suitable reinforcement and wrapping ]) package, shrink packaging, etc. are usable. Points, such as operability and sealing performance, to a pyro package is mainly desirable also in it. As one or more food is set to wrapping and the suitable above-mentioned space for the perimeter of food is specifically secured, an abbreviation seal package is carried out under the usual perimeter environment or N2 gas environment. As long as there is need, the thing in the condition of having gone into the open container made from plastics (styrene foam etc.) etc. is sufficient as the food in a package. an abbreviation seal package meaning the package which has the sealing performance of extent which can demonstrate the effectiveness (mild heat conduction to food) of this invention by warm air heat-treatment at the following defrosting process, and specifically in this invention The package in the condition (below rate of circulation 50 capacity %) that there is no circulation with an open air environment substantially, holding the above-mentioned predetermined perimeter space under the warm air ambient atmosphere in the following defrosting process is meant. As long as it fulfills this condition, although the class of wrapping is not asked and it is desirable for that seal nature to be also perfect, it may be imperfect.

[0011] The food packed as mentioned above is moved to the defrosting process of the last which has the greatest description in this invention. A defrosting process is crossed to a part of [ at least ] time amount of all defrosting time amount, and includes the defrosting processing by about 40 degrees C or more, for example, actuation of heat-treating preferably about 40 degrees C - 80 degrees C under an about 40 degrees C - 60 degrees C (specifically 38 degrees C - 62 degrees C) warm air ambient atmosphere, and the actuation which lowers the temperature of warm air rapidly so that the temperature to which the front face of the maturing feeding article does not exceed 25 degrees C may be maintained. That is, in a defrosting process, the defrosting under these specific temperature requirement conditions and a warm air ambient atmosphere is indispensable, and may be used combining other defrosting temperature conditions if needed. It is not necessary to specifically perform all the processes of defrosting in the above-mentioned specific temperature requirement. In a specific phase In case the main temperature of the food which cannot get warm most easily preferably passes the melting out temperature (generally before or after -5 degrees C) of an ice crystal Although what is usually thawed within the limits of the fusion time amount of an ice crystal in about 40 degrees C - 80 degrees C (preferably about 40 degrees C - 60 degrees C) temperature conditions (quick thawing processing) is indispensable about 40 degrees C or more If needed, at the temperature of a minimum lower than about 40 degrees C (specifically 38 degrees C), I hear that you may thaw quietly and it is at the time of others.

[0012] In the desirable mode of this invention in the melting out temperature (nearly -5 degrees C) of an ice crystal In the early stages of a defrosting process since most change of the temperature of goods is not seen only by a change of state occurring 14-25 degrees C, It is desirable to thaw slowly [ it is more desirable and ] at about (specifically 18-22 degrees C) 20 degrees C, and for main temperature to carry out quick thawing at nearly -5 degrees C above about 40 degree C (specifically 38-42 degrees C). By the approach of such this invention, the defrosting processing also of the rice food which requires the freshness using raw fish is attained at coincidence on the same defrosting conditions as other various food (for example, pressed sushi etc.). About 15-20 degrees C, rapid reduction actuation of the warm air temperature for

maintaining the food skin temperature after quick thawing below at 25 degrees C (preferably 18 degrees C) is preferably switched to about 18-degree C low-temperature wind, and is usually performed in fact. After raising temperature so that a defrosting process may be performed by warm air about 40 degrees C or more over a part of all defrosting time amount [ at least ] as mentioned above, and the front face of the maturing feeding article may not exceed 25 degrees C, and it may become 18 degrees C or less preferably, it is a base to lower the temperature of warm air rapidly and to adjust skin temperature.

[0013] In this invention, in order to carry out defrosting processing under the above warm air ambient atmospheres, the thermostat equipped with the warm air machine for being able to set to the thermostat of pertinent arbitration, i.e., fixed temperature, and abolishing the temperature unevenness by the location in equipment (homogeneity temperature being maintained) can be used. Moreover, in this invention, since a large number are suitable for carrying out defrosting processing of the food of an amount at coincidence, as for a thermostat, it is desirable that it is the structure where a lot of food can be installed and warm air can be sent in [ whole ] equipment at homogeneity.

[0014] The \*\*\*\* defrosting warehouse for extensive processing (A) specifically shown in drawing 3 as a thermostat which has the above functions can be used. This defrosting warehouse (A) is equipped with the fan (1) who can adjust to fixed temperature and can send warm air in a warehouse at homogeneity, and the migration shelf (3) of the shape of multistage [ which can arrange the food (2) with which the extensive number was frozen inside ] can take it now in and out. [ two or more ] Warm air circulates through the inside of a warehouse through the space between each food train on the tray (4) of each stage of a shelf (3) by the fan (1), and uniform warm air is sent with the whole food in a warehouse (2). As shown in drawing 1 , where the fixed perimeter space (6) which consists of an air space is secured by wrapping (5), the seal seal of each frozen food (2) is carried out, and it is arranged on the tray (4) of each stage of two or more migration shelves (3) ( drawing 2 ). The reticulated tray made from plastics is raised preferably [ that warm air has propagation and cone structure ] by the tray as a suitable example. After moving into a defrosting warehouse (A), arranging these migration shelves (3) that arranged food (2), as shown in drawing 3 , and closing a defrosting warehouse, by the fan (1) throughout the inside of a warehouse by thus, the thing for which uniform warm air is sent continuously Through the above-mentioned perimeter space, by mild heat conduction, there are few skin temperature of food and differences of whenever [ core temperature ], and they can perform little defrosting of the drip from food (mild heat conduction the pars basilaris ossis occipitalis minded wrapping and the tray section).

[0015] According to the defrosting approach of this invention which was mentioned above, as shown in the after-mentioned example, it turned out that various food can be thawed in large quantities to coincidence in the quality still in the state at the time of preparation.

[0016]

[Example] The following explains this invention in more detail according to an example.

[Example 1] The pyro package of what was frozen in the condition of dishing up rice and daily dishes in the container made from plastics (3.5cm in 25cm[ 17cm by ] x thickness) used as an inner case of lunch, and not making a top cover it (with liquefied carbon dioxide concomitant use compression refrigerating machine - 50 degrees C) was carried out with transparence plastic film (the product made from polypropylene, 40-micrometer thickness). Under the present circumstances, it sealed by heat welding in the state of pneumatic [ to which distance opens between the inner case of lunch, and a film inside a pyro package as drawing 1 ] (air content =

about 100% of food full capacity). After the pyro package, about six per step were arranged on the reticulated tray made from plastics as what was kept below -25 degrees C was shown in drawing 2 , and it put on 10-12 steps of trucks, and put into the warm air type defrosting warehouse of the structure of drawing 3 . About 20-degree C warm air is circulated after defrosting initiation for about 2 hours, and the main temperature of lunch is [ about ]. -After heating until it became 5 degrees C, it heated for 40 minutes at the temperature in a warehouse of 45 degrees C. Then, in 20 minutes, the temperature in a warehouse was lowered to 18 degrees C, and was thawed so that the temperature of lunch might not become 18 degrees C or more.

[0017] [Example 1 of evaluation] The flavor was evaluated by nine persons' panelist about the example 1 and the box lunch which has not been frozen. Consequently, the thing of an example 1 answered that it was same as compared with what has not carried out freezing defrosting. [ of nine persons ] The box lunch of the example 1 immediately after defrosting termination was evaluation that a flavor was good, from what has passed after manufacture for several hours with the box lunch which has not carried out freezing defrosting rather.

[0018] [Example 1 of a comparison] The frozen box lunch was thawed like the example 1 without performing a pyro package. In this case, the front face dried rice and a daily dish and the quality of original [ mouthfeel / a flavor and ] was spoiled. Moreover, since the skin temperature of food had become about 30 degrees C exceeding the optimal temperature of ordinary temperature preservation, it worried about degradation of the quality by bacterial propagation.

[0019] [Example 2 of a comparison] The interior of a pyro package was changed into the degassing condition, the frozen box lunch was packed, and it thawed like the example 1. From the part of others [ part / near the diffuser of warm air ], defrosting progressed early and has produced defrosting unevenness with other parts.

[0020]

[Effect of the Invention] as mentioned above, according to this invention approach, it is the quality still in the state at the time of preparation about two or more sorts of food, such as raw fish, rice, and a cooked daily dish, by the combination of the defrosting process of the closing space established in food, and specific conditions -- it is -- it is the quality beyond it and it becomes possible to thaw in large quantities at once in the same defrosting warehouse.

Furthermore, according to this invention, there is specifically the following effectiveness. In a series of freezing / defrosting systems, degradation of quality is sharply improvable with \*\*\*\*\* which establishes closing space in the perimeter of wrapping and food. Since warm air heat is mildly transmitted by this space, there is little effect of the temperature rise of an external world environment, desiccation by descent, and dew condensation, therefore there are few the skin temperature and the degree differences of core temperature of food, and prevention of a drip is possible. Even if it makes it in large quantities, it places it and it carries out it conventionally [, such as lunch, ] also when there are many shipments since the food currently dealt with as a product can be treated like a frozen ingredient, safe food without risk like bacterial propagation can be offered. In this case, that effectiveness increases further by freezing food immediately (continuation freezing being desirable) after manufacture. Since it is saved in the state of the package of abbreviation seal, the contamination under preservation can be prevented. At the time of a package, the effectiveness of desiccation prevention of food increases by packing in the ambient atmosphere near the saturated humidity in the temperature at the time of unpacking (usually room temperature).

## TECHNICAL FIELD

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[Field of the Invention] Even if it thaws this invention after refrigeration, the quality at the time of adjustment is related with the defrosting approach of food of hardly changing.

## PRIOR ART

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[Description of the Prior Art] Food is frozen, a mothball is performed, and in case it uses, the technique of thawing and taking in is performed for many years. However, when a Prior art was used, that quality has deteriorated as compared with the food before saving the thawed food which carried out cryopreservation was the fact which cannot be denied. Therefore, various techniques have been proposed for the purpose of preventing the degradation. Although most of these techniques were related with the device in the process which freezes food which is looked at by \*\*\*\*\* No. 500542 [ nine to ], the quality degradation prevention effectiveness it can fully be satisfied only with it of the effectiveness was not acquired.

[0003] [Summary of the Invention]

## EFFECT OF THE INVENTION

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[Effect of the Invention] as mentioned above, according to this invention approach, it is the quality still in the state at the time of preparation about two or more sorts of food, such as raw fish, rice, and a cooked daily dish, by the combination of the defrosting process of the closing space established in food, and specific conditions -- it is -- it is the quality beyond it and it becomes possible to thaw in large quantities at once in the same defrosting warehouse. Furthermore, according to this invention, there is specifically the following effectiveness. In a series of freezing / defrosting systems, degradation of quality is sharply improvable with \*\*\*\*\* which establishes closing space in the perimeter of wrapping and food. Since warm air heat is mildly transmitted by this space, there is little effect of the temperature rise of an external world environment, desiccation by descent, and dew condensation, therefore there are few the skin temperature and the degree differences of core temperature of food, and prevention of a drip is possible. Even if it makes it in large quantities, it places it and it carries out it conventionally [, such as lunch, ] also when there are many shipments since the food currently dealt with as a product can be treated like a frozen ingredient, safe food without risk like bacterial propagation can be offered. In this case, that effectiveness increases further by freezing food immediately (continuation freezing being desirable) after manufacture. Since it is saved in the state of the package of abbreviation seal, the contamination under preservation can be prevented. At the time of a package, the effectiveness of desiccation prevention of food increases by packing in the ambient atmosphere near the saturated humidity in the temperature at the time of unpacking (usually room temperature).

## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] this invention is the quality still in the state at the time of preparation after refrigeration about food -- it is -- it aims at providing in the quality beyond it and offering the defrosting approach that the various food with which defrosting conditions differ especially originally can moreover be extensive-number-processed on the same

conditions.

## MEANS

[Means for Solving the Problem] this invention persons are in the condition which secured the suitable air space for the perimeter, and carried out the abbreviation seal package of the target food after refrigeration, as a result of inquiring wholeheartedly in view of the above-mentioned trouble. It came to complete a header and this invention for the above-mentioned problem being solvable by heating and carrying out a temperature rise in a part of all defrosting time amount [ at least ] under warm air ambient atmosphere about 40 degrees C or more, lowering the temperature of warm air rapidly and thawing it so that the front face of the maturing feeding article may not exceed 25 degrees C. That is, this invention is the defrosting approach of the food which is the defrosting approach of food, and is in the condition which secured space in the perimeter and carried out the abbreviation seal package after refrigeration, heats food by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ], make carry out a temperature rise, and is characterized by to lower the temperature of warm air rapidly and to thaw it so that the temperature to which the front face of the maturing-feeding article does not exceed 25 degrees C may maintain. The desirable mode of the monograph affair in this invention is being 5% or more of the volume of food, and being a pyro package about a package, and performing the defrosting in the temperature of about 40 degrees C or more about defrosting conditions about the volume of space, in the phase the main temperature of food passing the melting out temperature of an ice crystal. In the process heated by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ], about the food after refrigeration, it is the style of low temperature, and it is the style of an elevated temperature and one desirable mode of this invention is an about 40-60-degree C thing to heat, after [ 14-25 degrees C ] heating.

[0005] [Concrete explanation of invention] the defrosting approach of the food by this invention Where it secured space in the perimeter and an abbreviation seal package is carried out after refrigeration, food A temperature rise is heated and carried out by warm air about 40 degrees C or more over a part of defrosting time amount [ at least ]. It just described above that it was what is characterized by lowering the temperature of warm air rapidly and thawing it so that the temperature to which the front face of the maturing feeding article does not exceed 25 degrees C may be maintained. By combining the maintenance below the warm air for maintaining the package near the abbreviation seal which secured space especially in the perimeter of food, and homogeneity temperature, and the constant temperature on the front face of food (25 degrees C or less) about food, it is the quality still in the state at the time of preparation -- it is -- it makes it possible to provide in the quality beyond it and to offer the defrosting approach also suitable for the purpose which carries out extensive processing of the various food with which defrosting conditions moreover differ originally on the same defrosting conditions.

[0006] The food set as the object of this invention is the rice food which combined rice, one or more sorts of other food, and rice and one or more sorts of other food, in this invention, it can be independent respectively, or can combine these food kinds of two or more sorts, and can carry out defrosting processing. As a suitable example of other food, daily dishes, such as roast fish, an omelet, a fry, and tempura, are raised. The pressed sushi which carried the fish and shellfishes of the box lunch which combined one or more sorts and rice of the above daily dishes, mackerel, \*\*\*\*, \*\*, etc., etc. on vinegared rice, and carried out pressing as a desirable example of rice food can be raised as an example of representation. however, it limits especially -- not having --



volume sushi and an ingredient -- if one or more sorts of food is combined with rice including an entering rice ball in addition to this, it cannot be overemphasized that it can apply widely.

[0007] In this invention, a freezing process is first presented with the above food. In this case, it is independent, respectively, or rice, one or more sorts of other food, and two or more sorts of rice food can be combined, and the same freezing process can be presented with them at coincidence. Especially if the frozen conditions of food are conditions which food freezes, they will not be limited, but freezing in freezing by the usual freezer, blasting of a liquefied carbon dioxide, or an air-blast type plural (usually 2 yuan) refrigerant type compressor freezer (-45--75 degree C) is possible for them. Even if food is unpacked in a freezing process, it does not matter even if it carries out the lap by the thin bright film of a food grade, but when the approach by the liquefied carbon dioxide is suitable when unpacked, and the adhesion lap package is carried out, it is possible also in an air-blast type freezer. the range whose main temperature of food of freezing is usually -15--30 degree C -- it continues until it becomes -20 degrees C or less preferably. In addition, the freezing process by blasting of a liquefied carbon dioxide can be performed on large-scale level using tunnel type liquefied carbon dioxide blasting equipment etc. that what is necessary is just to use usual liquefied carbon dioxide blasting equipment, when small-scale.

[0008] required after reaching to the above predetermined freezing temperature conditions until it usually moves food to a preservation process and presents the following defrosting process -- period preservation is carried out. -25 degrees C or less of preservation are preferably performed in -25--35 degree C. In this preservation process, if it exceeds the above-mentioned predetermined temperature requirement, since the quality after defrosting will deteriorate, it is not desirable. In addition, this preservation process can be performed using the usual food-grade freezer.

[0009] In this invention, the frozen food is preferably given to a packaging process in front of a preservation process in front of a preservation process or the following freezing process. a package of freezing food -- between food external surface -- space -- usually -- 5% or more of perimeter space of the food volume -- 30% - 100% of perimeter space is secured more preferably 5% to 200%, and an abbreviation seal package is carried out. Although this closing space established in the perimeter of food by package is for preventing that food touches this defrosting environment directly in the following defrosting process, is usually packed in a perimeter environment and contains an air space, it may be packed in other perimeter environments, such as inside of N2 gas, and may contain that gas layer.

[0010] Although the wrapping usually used for a seal package can be used for wrapping and plastic film, such as polypropylene and polyethylene, paper, the laminated paper of plastics, etc. are raised as an example, the film made from extension polypropylene is especially desirable.

The seal of wrapping can be performed using the usual approaches, such as heat welding, RF adhesion, and adhesion by the binder, according to the property of each ingredient. It may bend without performing a seal especially depending on wrapping, and torsion etc. may perform \*\*.

As an example of an abbreviation seal package in which closing space was established in the perimeter of food If it is possible to secure required space, it is a saccate package (for example, a pyro package). The method seal package of three, the method seal package of four, the package which uses a bag [ finishing / bag manufacture ] and a box-like package, the package by the combination of a tray and a lid, a lap (when having put food into container which has adiathermic [ comparable as suitable reinforcement and wrapping ]) package, shrink packaging, etc. are usable. Points, such as operability and sealing performance, to a pyro package is mainly



desirable also in it. As one or more food is set to wrapping and the suitable above-mentioned space for the perimeter of food is specifically secured, an abbreviation seal package is carried out under the usual perimeter environment or N<sub>2</sub> gas environment. As long as there is need, the thing in the condition of having gone into the open container made from plastics (styrene foam etc.) etc. is sufficient as the food in a package. an abbreviation seal package meaning the package which has the sealing performance of extent which can demonstrate the effectiveness (mild heat conduction to food) of this invention by warm air heat-treatment at the following defrosting process, and specifically in this invention The package in the condition (below rate of circulation 50 capacity %) that there is no circulation with an open air environment substantially, holding the above-mentioned predetermined perimeter space under the warm air ambient atmosphere in the following defrosting process is meant. As long as it fulfills this condition, although the class of wrapping is not asked and it is desirable for that seal nature to be also perfect, it may be imperfect.

[0011] The food packed as mentioned above is moved to the defrosting process of the last which has the greatest description in this invention. A defrosting process is crossed to a part of [ at least ] time amount of all defrosting time amount, and includes the defrosting processing by about 40 degrees C or more, for example, actuation of heat-treating preferably about 40 degrees C - 80 degrees C under an about 40 degrees C - 60 degrees C (specifically 38 degrees C - 62 degrees C) warm air ambient atmosphere, and the actuation which lowers the temperature of warm air rapidly so that the temperature to which the front face of the maturing feeding article does not exceed 25 degrees C may be maintained. That is, in a defrosting process, the defrosting under these specific temperature requirement conditions and a warm air ambient atmosphere is indispensable, and may be used combining other defrosting temperature conditions if needed. It is not necessary to specifically perform all the processes of defrosting in the above-mentioned specific temperature requirement. In a specific phase In case the main temperature of the food which cannot get warm most easily preferably passes the melting out temperature (generally before or after -5 degrees C) of an ice crystal Although what is usually thawed within the limits of the fusion time amount of an ice crystal in about 40 degrees C - 80 degrees C (preferably about 40 degrees C - 60 degrees C) temperature conditions (quick thawing processing) is indispensable about 40 degrees C or more If needed, at the temperature of a minimum lower than about 40 degrees C (specifically 38 degrees C), I hear that you may thaw quietly and it is at the time of others.

[0012] In the desirable mode of this invention in the melting out temperature (nearly -5 degrees C) of an ice crystal In the early stages of a defrosting process since most change of the temperature of goods is not seen only by a change of state occurring 14-25 degrees C, It is desirable to thaw slowly [ it is more desirable and ] at about (specifically 18-22 degrees C) 20 degrees C, and for main temperature to carry out quick thawing at nearly -5 degrees C above about 40 degree C (specifically 38-42 degrees C). By the approach of such this invention, the defrosting processing also of the rice food which requires the freshness using raw fish is attained at coincidence on the same defrosting conditions as other various food (for example, pressed sushi etc.). About 15-20 degrees C, rapid reduction actuation of the warm air temperature for maintaining the food skin temperature after quick thawing below at 25 degrees C (preferably 18 degrees C) is preferably switched to about 18-degree C low-temperature wind, and is usually performed in fact. After raising temperature so that a defrosting process may be performed by warm air about 40 degrees C or more over a part of all defrosting time amount [ at least ] as mentioned above, and the front face of the maturing feeding article may not exceed 25 degrees

C, and it may become 18 degrees C or less preferably, it is a base to lower the temperature of warm air rapidly and to adjust skin temperature.

[0013] In this invention, in order to carry out defrosting processing under the above warm air ambient atmospheres, the thermostat equipped with the warm air machine for being able to set to the thermostat of pertinent arbitration, i.e., fixed temperature, and abolishing the temperature unevenness by the location in equipment (homogeneity temperature being maintained) can be used. Moreover, in this invention, since a large number are suitable for carrying out defrosting processing of the food of an amount at coincidence, as for a thermostat, it is desirable that it is the structure where a lot of food can be installed and warm air can be sent in [ whole ] equipment at homogeneity.

[0014] The \*\*\*\* defrosting warehouse for extensive processing (A) specifically shown in drawing 3 as a thermostat which has the above functions can be used. This defrosting warehouse (A) is equipped with the fan (1) who can adjust to fixed temperature and can send warm air in a warehouse at homogeneity, and the migration shelf (3) of the shape of multistage [ which can arrange the food (2) with which the extensive number was frozen inside ] can take it now in and out. [ two or more ] Warm air circulates through the inside of a warehouse through the space between each food train on the tray (4) of each stage of a shelf (3) by the fan (1), and uniform warm air is sent with the whole food in a warehouse (2). As shown in drawing 1 , where the fixed perimeter space (6) which consists of an air space is secured by wrapping (5), the seal seal of each frozen food (2) is carried out, and it is arranged on the tray (4) of each stage of two or more migration shelves (3) ( drawing 2 ). The reticulated tray made from plastics is raised preferably [ that warm air has propagation and cone structure ] by the tray as a suitable example. After moving into a defrosting warehouse (A), arranging these migration shelves (3) that arranged food (2), as shown in drawing 3 , and closing a defrosting warehouse, by the fan (1) throughout the inside of a warehouse by thus, the thing for which uniform warm air is sent continuously Through the above-mentioned perimeter space, by mild heat conduction, there are few skin temperature of food and differences of whenever [ core temperature ], and they can perform little defrosting of the drip from food (mild heat conduction the pars basilaris ossis occipitalis minded wrapping and the tray section).

[0015] According to the defrosting approach of this invention which was mentioned above, as shown in the after-mentioned example, it turned out that various food can be thawed in large quantities to coincidence in the quality still in the state at the time of preparation.

## EXAMPLE

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[Example] The following explains this invention in more detail according to an example.

[Example 1] The pyro package of what was frozen in the condition of dishing up rice and daily dishes in the container made from plastics (3.5cm in 25cm[ 17cm by ] x thickness) used as an inner case of lunch, and not making a top cover it (with liquefied carbon dioxide concomitant use compression refrigerating machine - 50 degrees C) was carried out with transparence plastic film (the product made from polypropylene, 40-micrometer thickness). Under the present circumstances, it sealed by heat welding in the state of pneumatic [ to which distance opens between the inner case of lunch, and a film inside a pyro package as drawing 1 ] (air content = about 100% of food full capacity). After the pyro package, about six per step were arranged on the reticulated tray made from plastics as what was kept below -25 degrees C was shown in drawing 2 , and it put on 10-12 steps of trucks, and put into the warm air type defrosting

warehouse of the structure of drawing 3 . About 20-degree C warm air is circulated after defrosting initiation for about 2 hours, and the main temperature of lunch is [ about ]. -After heating until it became 5 degrees C, it heated for 40 minutes at the temperature in a warehouse of 45 degrees C. Then, in 20 minutes, the temperature in a warehouse was lowered to 18 degrees C, and was thawed so that the temperature of lunch might not become 18 degrees C or more.

[0017] [Example 1 of evaluation] The flavor was evaluated by nine persons' panelist about the example 1 and the box lunch which has not been frozen. Consequently, the thing of an example 1 answered that it was same as compared with what has not carried out freezing defrosting. [ of nine persons ] The box lunch of the example 1 immediately after defrosting termination was evaluation that a flavor was good, from what has passed after manufacture for several hours with the box lunch which has not carried out freezing defrosting rather.

[0018] [Example 1 of a comparison] The frozen box lunch was thawed like the example 1 without performing a pyro package. In this case, the front face dried rice and a daily dish and the quality of original [ mouthfeel / a flavor and ] was spoiled. Moreover, since the skin temperature of food had become about 30 degrees C exceeding the optimal temperature of ordinary temperature preservation, it worried about degradation of the quality by bacterial propagation.

[0019] [Example 2 of a comparison] The interior of a pyro package was changed into the degassing condition, the frozen box lunch was packed, and it thawed like the example 1. From the part of others [ part / near the diffuser of warm air ], defrosting progressed early and has produced defrosting unevenness with other parts.

## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The perspective view showing the condition of a pyro package of the food in an example 1.

[Drawing 2] The perspective view showing the array condition in shelving of the box lunch (pyro package) in an example 1.

[Drawing 3] The front view showing the arrangement condition of the box lunch (it arranges on shelving) in the defrosting warehouse in an example 1.

[Description of Notations]

A Defrosting warehouse

1 Fan

2 Food

3 Shelf

4 Tray

5 Wrapping

6 Space of Perimeter of Food